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NASA-15225 (October 2003)
NATIONAL AERONAUTICS **NASA**
AND SPACE ADMINISTRATION **Superseding NASA-15225**
(September 1999)

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SECTION TABLE OF CONTENTS

DIVISION 15 - MECHANICAL

SECTION 15225

CHEMICAL-WASTE DRAINAGE SYSTEMS

10/03

-- End of Section Table of Contents --

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SECTION 15225

CHEMICAL-WASTE DRAINAGE SYSTEMS
10/03

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NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers various corrosion-resistant chemical-waste drainage systems.

Select required system materials and delete all others. This section should be used in conjunction with Section 15050 BASIC MECHANICAL MATERIALS AND METHODS.

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PART 1 GENERAL

1.1 REFERENCES

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NOTE: The following references should not be manually edited except to add new references. References not used in the text will automatically be deleted from this section of the project specification.

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The publications listed below form a part of this section to the extent referenced:

ASME INTERNATIONAL (ASME)

ASME B16.12 (1991) Cast-Iron Threaded Drainage Fittings

ASTM INTERNATIONAL (ASTM)

ASTM A 518 (1992) Corrosion-Resistant High-Silicon Iron Castings

ASTM A 518M (1992) Corrosion-Resistant High-Silicon Iron Castings (Metric)

ASTM C 1036	(1991) Standard Specification for Flat Glass
ASTM D 1559	(1989) Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
ASTM D 2447	(1993) Standard Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80 Based on Outside Diameter
ASTM D 2665	(1994; Rev A) Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D 4101	(1995) Propylene Plastic Injection and Extrusion Materials

1.2 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01330 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.

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The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES in sufficient detail to show full compliance with the specification:

SD-02 Shop Drawings

Installation Drawings shall be submitted in accordance with pargraph entitled, "General Requirements," of this section.

SD-03 Product Data

Manufacturer's catalog data shall be submitted for the following items:

Borosilicate Glass Materials
High-Silicon Cast Iron Material
Polyethylene Material
Polypropylene Material
Polyvinylchloride Material

SD-06 Test Reports

Test Reports shall be submitted in accordance with pargraph entitled, "Installation and Testing," of this section.

SD-07 Certificates

Listing of Product Installations shall be submitted in accordance with pargraph entitled, "Installation and Testing," of this section.

Certificates shall be submitted for the following items showing conformance with the referenced standards contained in this section.

Borosilicate Glass Materials
High-Silicon Cast Iron Material
Polyethylene Material
Polypropylene Material
Polyvinylchloride Material

1.3 GENERAL REQUIREMENTS

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NOTE: If Section 15003 GENERAL MECHANICAL PROVISIONS is not included in the project specification, applicable requirements therefrom should be inserted and the following paragraph deleted.
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Section 15003 GENERAL MECHANICAL PROVISIONS applies to work specified in this section.

Installation Drawings shall be submitted for chemical-waste drainage systems in accordance with the manufacturer's recommended instructions.

PART 2 PRODUCTS

2.1 BOROSILICATE GLASS, TYPE BSG

Borosilicate Glass Materials for drain, waste, and vent piping systems shall be tempered and annealed in conformance with ASTM C 1036. Coupling shall be AISI Type 304 corrosion-resistant steel lined with Buna-N resilient member supporting a tetrafluoroethylene liner. Liner shall be the only material wetted by waste stream. Piping class shall be BSG-1.

[Vent-system materials 6 feet 1800 millimeter and higher above the floor shall be Type PP or PVC with extra-heavy Type HSCI extension through roof.]

2.2 HIGH-SILICON CAST IRON, TYPE HSCI

High-Silicon Cast Iron Material (ASTM A 518) (ASTM A 518M) for drain, waste, and vent piping systems shall be bell-and-spigot or beaded-end straight barrel, extra heavy, acid-resistant soil pipe containing not less than 14-1/2 percent silicon. Joint seals shall be lead and acid-resistant

packing. Mechanical joint shall be a coupling constructed of AISI Type 304 corrosion-resistant steel with chloroprene resilient member supporting a tetrafluoroethylene liner. Liner shall be the only material wetted by waste stream. Nut shall be tightened to a minimum of 9 foot-pounds 12 newton-meter.

[Vent-system materials 6 feet 1800 millimeter and higher above the floor shall be Type PP or Type PVC with extra-heavy Type HSCI extensions through roof.]

2.3 POLYETHYLENE DRAIN, WASTE, AND VENT, TYPE PE-DWV

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NOTE: This specification for polyolefin thermoplastic drain, waste, and vent system materials provides for polyethylene use as a single material uniformly throughout the system or as a mixture of compatible materials. Materials include P-traps, drum traps, cup sinks, waste drains, downspouts, stand pipes, etc., as indicated.

PE materials are not recommended for service in subfreezing temperatures.

Type PE materials are prone to environmental-stress cracking. Ultraviolet light degrades PE materials.

Maximum continuous duty of type PE-DWV materials shall not exceed 180 degrees F 82 degrees C. In multistory buildings, consider type HSCI or Type BSG mains or stacks.

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Polyethylene Material for drain, waste, and vent piping systems shall be manufactured from polyethylene (PE) olefin resins in conformance with ASTM D 2447 and ASME B16.12 for applicable dimensions and configurations. Pipe wall thickness shall be Schedule 40. PE materials shall be Type PE-2306, black, specifically suitable for joining by fusion of interfaces into a homogeneous mass at high temperatures. Threaded assemblies shall be molded. No thread cutting will be permitted.

Vent extensions through the roof shall be extra-heavy Type HSCI.

[Selected drainage-system components may be manufactured from polypropylene (PP) materials, provided proposed means and methods of connection are recommended by the manufacturing source.]

2.4 POLYPROPYLENE DRAIN, WASTE, AND VENT, TYPE PP-DWV

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NOTE: This specification for polyolefin thermoplastic drain, waste, and vent systems materials provides for pp use as a single material uniformly throughout the system or as a mixture of

compatible materials. Materials include P-traps, drum traps, cup sinks, waste drains, downspouts, stand pipes, etc., as indicated.

Maximum continuous duty of type PP-DWV materials shall not exceed 180 degrees F 82 degrees C. In multistory buildings, consider Type HSCI or Type BSG for mains or stacks.

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Polypropylene Material for drain, waste, and vent piping systems shall be manufactured from Type I - 19509, black olefin resins conforming to ASTM D 4101. Materials shall be manufactured and tested in accordance with applicable provisions of ASTM D 2447. Materials dimensions and configurations shall comply with applicable provisions of ASME B16.12.

Pipe-wall thickness shall be Schedule 40, and minimum burst pressure when tested in accordance with ASTM D 1559 for 60 to 90 seconds, shall be as follows:

Size (inches)	1-1/2	2	3	4
Burst Pressure	665	550	530	450 (pounds per square inch)
Size (millimeter) DN	40	50	80	100
Burst Pressure (kilopascal)	4585	380	3650	3100

PP materials shall be specifically suitable for joining interfaces into a homogeneous mass by fusion at high temperatures. Threaded assemblies shall be molded. No thread cutting will be permitted.

Vent extensions through the roof shall be extra-heavy Type HSCI.

[Selected drainage system components shall be manufactured from PE materials when so specified, and provided proposed means and methods of connection are recommended by the manufacturing source.]

2.5 POLYVINYLCHLORIDE DRAIN, WASTE, AND VENT, TYPE PVC-DWV

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NOTE: The following specification provides for polyvinylchloride thermoplastic drain, waste, and vent systems materials which include pipe and dwv fittings. P-traps, drum traps, cup sinks, waste drains, downspouts, standpipes, etc., are not covered.

Maximum continuous duty of PVC DWV materials shall not exceed 150 degrees F 66 degrees C. In multistory buildings, consider Type HSCI or Type BSG mains or stacks.

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Polyvinylchloride Material drain, waste, and vent piping-system materials shall be manufactured from Type I normal impact resins in conformance with ASTM D 2665 and ASME B16.12 for applicable dimensions. Material shall be gray and specifically suited for joining socket interfaces into a homogeneous mass by solvent-cement welding.

Fittings shall be molded to produce, upon insertion of pipe, an interference fit at approximately 2/3 of the depth of the socket. No thread cutting will be permitted.

Vent extensions through the roof shall be extra-heavy type HSCI.

PART 3 EXECUTION

3.1 INSTALLATION AND TESTING

Test Reports consisting of system operation tests shall be submitted for chemical-waste drainage systems.

Listing of Product Installations for chemical-waste drainage systems shall include identification of at least five units, similar to those proposed for use, that have been in successful service for a minimum of five years. List shall include purchaser, address of installation, service organization, and date of installation.

Equipment shall be installed and tested in accordance with manufacturer's recommendations.

-- End of Section --